

【CLAIMS】

5 **【Claim 1】** A satellite tracking antenna system mounted to a moving object to track a satellite position, which includes an antenna unit 100 for receiving a satellite signal; a gyro sensor unit 200 for detecting the movement of a moving object; a control board 300 for receiving intensity information of the satellite signal from the antenna unit 100, receiving moving information of the moving object from the gyro sensor unit 200, and tracking the satellite position according to the received intensity and moving information; and an azimuth angle motor 410 and an elevation angle motor 420 for rotating the antenna unit to be directed to the satellite according to a control signal generated from the control board 300, the system comprising:

the gyro sensor unit 200 including first and second gyro sensors R1' and R2 which are mounted to be orthogonal to each other to a planar axis perpendicular to a satellite-directed target point of the antenna unit 100, wherein

15 the first gyro sensor R2 is mounted in parallel to the planar axis to measure a first angular velocity variable in an elevation angle of the moving object, such that it transmits the first angular velocity variable in the elevation angle to the control board 300, and

20 the second gyro sensor R1' is mounted in perpendicular to the planar axis to measure a second angular velocity variable in an azimuth angle of the moving object, such that it transmits the second angular velocity variable in the azimuth angle to the control board 300.

5 **【Claim 2】** The system according to claim 1, wherein the first and second gyro sensors R1' and R2 contained in the gyro sensor unit 200 are arranged to be orthogonal to each other to a back surface of an antenna plate for supporting an antenna 110 contained in the antenna unit 100, in which the first gyro sensor is arranged in a horizontal direction and the second gyro sensor is arranged in a vertical direction.

10 **【Claim 3】** The system according to claim 1, wherein the azimuth angle motor 410 is mounted onto a fixed base plate 1 capable of being horizontally rotated by a vertical axis S1 in an antenna lower cover H detachably covered with a dome-shaped cover C, mounts a bearing 5 for use in the vertical axis S1 onto a top surface of the base plate 1, and transmits power to the vertical axis S1 exposed toward a lower part of the base plate 1 via a timing belt 6 connected to a lower drive pulley 2a.

15 **【Claim 4】** The system according to claim 1, wherein the elevation angle motor 420 is mounted to a motor fixing unit 1a, which is bent and formed on one surface of a fixed base plate 1 capable of being horizontally rotated by a vertical axis S1 via a bearing 5 in an antenna lower cover H detachably covered with a dome-shaped cover C.

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【Claim 5】 The system according to claim 4, wherein:

a semicircular pulley 3 is fixed by first and second fixed plates 7a and 7b to one side of a back surface of an antenna plate 111 for supporting the antenna 110 contained in the antenna unit 100, and a third fixed plate 7c is fixed to the

other side of the back surface of the antenna plate 111, such that the first to third fixed 7a, 7b, and 7c plates are rotatably coupled to an extended-bent support unit 1b located on both sides of the base plate 1, and are rotated on the basis of a horizontal axis S2, and

5 a timing belt 4 fixes its one end to both ends of the semicircular pulley 3, and is connected to a drive pulley 2b of the elevation angle motor 420 via a separation prevention groove 3a formed on a circumference of the semicircular pulley 3, such that the elevation angle of the antenna plate 111 is controlled.

10 **【Claim 6】** The system according to claim 5, wherein the support unit 1b of the base plate 1 includes a limit switch 8 which is turned on by touch action of the antenna plate 111 when the antenna plate 111 is arranged in parallel to the base plate 1 in a vertical rotation process of the antenna plate 111.

15 **【Claim 7】** A one-axis satellite tracking antenna system mounted to a moving object to track a satellite position, which includes an antenna unit for receiving a satellite signal; a gyro sensor for detecting the movement of a moving object; a control board for receiving intensity information of the satellite signal from the antenna unit, receiving moving information of the moving object from the gyro
20 sensor, and tracking the satellite position according to the received intensity and moving information; and an azimuth angle motor for rotating the antenna unit according to a control signal generated from the control board such that an azimuth angle of the antenna unit is directed to the satellite, the system comprising:

the gyro sensor which is mounted in perpendicular to a planar axis

arranged in perpendicular to a target direction of the antenna unit, measures an angular velocity variable in the azimuth angle of the moving object, and transmits the measured angular velocity to the control board.

5 **【Claim 8】** A satellite tracking method for use in a satellite tracking antenna system mounted to a moving object to track a satellite position, which includes an antenna unit 100 for receiving a satellite signal; a gyro sensor unit 200 for detecting the movement of a moving object; a control board 300 for receiving intensity information of the satellite signal from the antenna unit 100, receiving
10 moving information of the moving object from the gyro sensor unit 200, and tracking the satellite position according to the received intensity and moving information; and an azimuth angle motor 410 and an elevation angle motor 420 for rotating the antenna unit 100 to be directed to the satellite according to a control signal generated from the control board 300, the method comprising the steps of:

15 a) measuring reference output values of first and second gyro sensors R1' and R2 contained in the gyro sensor unit 200, the first and second gyro sensors being mounted to a back surface of an antenna plate 111 perpendicular to a satellite-directed target point of the antenna unit 100 such that they are orthogonal to each other in horizontal and vertical directions;

20 b) horizontally and vertically rotating the antenna unit 100 using the azimuth angle motor 410 and the elevation angle motor 420, detecting a specific point at which the intensity of the satellite signal received from the antenna unit is higher than a reference value, and detecting an initial position of the satellite on the basis of the detected point;

c) receiving intensity information of the satellite signal from the antenna unit 100, receiving movement information in azimuth and elevation angles of the moving object from the first and second gyro sensors R1' and R2, and continuously tracking the satellite position detected at step (b) according to the received intensity and movement information; and

d) calculating output values of the first and second gyro sensors R1' and R2 continuously changed with peripheral environments at step (c) for tracking the satellite position, and calibrating reference output values of the first and second gyro sensors R1' and R2 .

10 **【Claim 9】** The method according to claim 8, wherein the step a) for measuring the reference output values of the first and second gyro sensors R1' and R2 includes the steps of:

15 a1) driving the elevation angle motor 420, and allowing the antenna plate 111 to which the first and second gyro sensors R1' and R2 are mounted to be in parallel to a base plate 1 using the elevation angle motor 420;

20 a2) measuring the output values of the first and second gyro sensors R1' and R2 at intervals of a predetermined time on the condition that the first and second gyro sensors R1' and R2 are arranged in parallel to the base plate 1 such that they are unaffected by the movement of the azimuth angle of the moving object; and

 a3) calculating a mean value of the output value of the first gyro sensor R1' and a mean value of the output value of the second gyro sensor R2, respectively, and acquiring reference output values of the first and second gyro

sensors.

【Claim 10】 The method according to claim 8, wherein the step d) for calibrating the reference output values of the first and second gyro sensors R1' and

5 R2 includes the steps of:

d1) arbitrarily changing reference output values of the first and second gyro sensors R1' and R2 to others, and controlling the antenna unit 100 to be rotated on the basis of the satellite such that the antenna unit 100 rotates along a square line in a predetermined direction centering around the satellite;

10 d2) measuring four times in four directions (i.e., right, left, and up and down directions) consumed when the antenna unit rotates along the square line according to the changed reference values of the first and second gyro sensors R1' and R2, respectively; and

15 d3) calculating the measured four times consumed when the antenna unit rotates in the four directions and the arbitrarily-changed reference output values of the first and second gyro sensors R1' and R2, acquiring changed reference output values of the first and second gyro sensors R1' and R2, and calibrating the reference output values of the first and second sensors R1' and R2 using the acquired reference output values.

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